UDC 633.11«321»:631.527.5 https://doi.org/10.31867/2523-4544/0333

DEVELOPMENT OF SPRING WHEAT SOURCE MATERIAL BY CROSSING SPECIES *TRITICUM AESTIVUM* L. x *TRITICUM DURUM* DESF.

L. V. Ivantsova , M. V. Fedorenko
The V. M. Remeslo Myronivka Institute of Wheat NAAS, Tsentralne village, Obukhiv district, Kyiv region, 08853, Ukraine

Topicality. *Modern plant breeding involves many factors, among which the source material holds the first place. The experience of global and domestic breeding shows the importance of using genetic sources from around the world to develop new wheat varieties meeting the requirements of modern agricultural production.* ***Purpose.*** *To develop a new spring wheat source material by crossing samples of Triticum aestivum* L. × *Triticum durum* Desf. *of domestic and foreign selection.* ***Materials and Methods.*** *The research was carried out at the V.M. Remeslo Myronivka Institute of Wheat NAAS of Ukraine. The parental forms for hybridisation were MIP Vesnianka variety and Erythrospermum 15–36 line of spring wheat, and MIP Kseniia variety of durum wheat of domestic selection and Triso variety of spring wheat of foreign selection. In the heading stage, florets were castrated in the usual way 2–3 days before flowering. Pollination was carried out by a limited forced method in the morning, mainly on 3–5 days after castration. Twelve cross combinations were developed. Threshing of wheat spikes was carried out manually.* ***Results.*** *It was found that the efficiency of spring wheat grain setting during crossing depended not only on the environmental conditions during pollination, but also on the genotypic diversity of the crossing components. The average grain-setting percentage varied from 0 to 56.2%, depending on the source forms and growing conditions of the plants. The average grain-setting percentage was 16.0 % in 2022 and 17.1 % in 2023. In 2022, this indicator varied from a minimum of 1.0 % to a maximum of 43.7 %, and this indicator varied from 1.9 % to 56.2 % in 2023.* ***Conclusions****. It was found that the of grain-setting percentage in spring wheat hybrids was significantly higher when crossing varieties and line Triticum aestivum* L. × *Triticum aestivum* L. *compared to Triticum aestivum* L. × *Triticum durum* Desf. *and Triticum durum* Desf. × *Triticum aestivum* L.*, regardless of the crossing groups. The highest indicators of grain setting were observed in the group of paternal and maternal components in crosses of varieties and line of domestic selection. It was found that the effectiveness of crossing, i.e. the percentage of grain setting in the field conditions, depended on the genetic characteristics of the variety and the growing conditions of spring wheat plants.*

Key words: *spring wheat, hybridisation, crossbreeding, grain-setting percentage, variety, line*

Introduction. Hybridisation is the main justified and effective method of developing source material for spring wheat breeding and the main source of wheat genetic diversity [1]. The advisability of using interspecific hybridisation in wheat breeding has been proved by the development of varieties and promising forms of this crop with valuable breeding traits. In addition, intraspecific diversity in many crops, including wheat, is practically exhausted for a number of traits useful for breeding, and the genetic pool of varieties commonly used in crop production has become highly related; therefore, new genetic sources of breeding traits, in particular from related crop species and genera, are becoming relevant for improving the development process [2]. For this reason, the development of high-yielding varieties requires taking into account the inheritance of traits and properties under certain developmental conditions in order to predict the final results of hybridisation [3]. Until now, the main achievements in plant breeding have been related to the ability of the breeder to select the best genotypes based on a combination of morphological and physiological traits [4].

Optimising the breeding strategy requires having databases of quantitative traits of crops. Modelling methods for varieties and the breeding process should be based on knowledge of the genetics of quantitative traits. M. I. Vavilov pointed out the rich generic potential of wheat and the importance of clear differentiation into species and ecological and geographical groups and their appropriate application in plant breeding [5].

Author information:

Liudmila V. Ivantsova, *Postgraduate Student, Junior Researcher at the Spring Wheat Breeding Laboratory,* e-mail: ivancovaluda75@gmail.com, https://orcid.org/0000-0001-7319-9653

Maryna V. Fedorenko, *Candidate of Agricultural Sciences, Senior Researcher at the Spring Wheat Breeding Laboratory,* e-mail: maryna.fedorenko.v@gmail.com, https://orcid.org/0000-0002-3021-3643

Two cultivated wheat species are widespread: soft and durum wheat; other cultivated and wild species with limited distribution and closely related species (Aegilops and couch grass) are stored in special collections of genetic material and used in plant breeding as donors of certain valuable traits [6]. Interspecific and intergeneric crosses are essential elements of breeding work that are widely used in breeding for productivity [7].

The most common method is the involvement of ecologically and geographically distant plant forms in hybridisation. The development of spring wheat varieties through hybridisation begins with the selection of parental components for a set of valuable economic traits. Components for crossing (*Triticum aestivum* L. and *Triticum durum* Desf.) should be selected according to the ecological and geographical principle and with consideration of the adaptive capacity of the variety, trait parameters and the availability of valuable genetic components [8, 9]. However, it is generally recognised that one of the parental components of the crossing should be varieties or lines that are well adapted to local soil and climatic conditions [10–13].

The research was aimed at developing a new source material of spring wheat by crossing different species *Triticum aestivum* L. × *Triticum durum* Desf. of domestic and foreign selection.

Materials and Methods. The research was conducted at the V.M. Remeslo Myronivka Institute of Wheat of NAAS of Ukraine (MIP) in 2022–2023. The varieties for crossing were selected among the species *Triticum aestivum* L. and *Triticum durum* Desf. For hybridisation, spring wheat genotypes with high potential for productivity and adaptability to local conditions were selected, considering the indicators of yield attributes, grain quality, drought tolerance and resistance to pathogens. The parental forms for hybridisation were the soft spring wheat variety MIP Vesnianka, the Erythrospermum 15–36 line, the durum spring wheat variety MIP Kseniia of domestic selection and the soft spring wheat variety Triso of foreign selection [14–16]. In the heading stage, florets were castrated in the usual way 2–3 days before flowering. Pollination was carried out in a limited forced method in the morning, mainly on 3-5 days after castration [17]. There were 12 cross combinations (*Triticum aestivum* L. × *Triticum aestivum* L., *Triticum aestivum* L. × *Triticum durum* Desf., *Triticum durum* Desf. × *Triticum aestivum* L.). Hybrid spikes were threshed manually.

Results and Discussion. The weather conditions during the research in 2022–2023 differed from the long-term averages in terms of temperature, precipitation and their distribution during certain periods of plant growth and development of spring wheat (Table 1). It should be noted that the weather conditions in 2022 were favourable for the spring wheat growth and development, but were accompanied by uneven distribution of precipitation and temperature. The early and cool spring was accompanied by an average daily temperature of + 7.8 °C between sowing and seedling stage, which was 0.7 °C higher than the long-term average. From seedlings to stem elongation, the average daily temperature was recorded at +11.2 °C, which was 1.3 °C lower than the long-term average with frequent precipitation (72.1 mm), compared to the long-term average (58.0 mm). Plants vegetated from stem elongation to heading stage at an air temperature of + 18.0 °C, which was 1.6 °C higher than the long-term average, while precipitation was only 13.0 mm, which was 35 mm lower than the long-term average. During the heading – full ripeness period, the air temperature was +20.4 °C, which was 0.8 °C higher than the long-term average. Precipitation was 92.8 mm (35.2 mm less than the long-term average). In the different periods of spring wheat ontogeny, we observed different hydrothermal regimes: the sowing – seedlings period was accompanied by excessive moisture (HTC = 3.02); the seedlings – heading period had optimal moisture (HTC = 1.35); drought was observed in stem elongation – heading and heading – full ripeness periods, where HTC was 0.66 and 0.97, respectively. In 2023, plants vegetated from sowing to seedlings stage under an average daily air temperature of + 8.3 °C, which was 1.2 °C higher than the long-term average and was accompanied by excessive moisture (54.6 mm) compared to the long-term average (37.0 mm). From seedlings to heading stage, the average daily temperature was within the long-term average and amounted to + 12.5 °C.

From stem elongation to heading, the air-temperature was at + 18.2 °C, which is 1.8 °C higher than the long-term average, and precipi-

Table 1. Hydrothermal conditions during growing season of spring wheat plants, 2022–2023

Development period	Parameter	2022	2023	Long-term average
Sowing – seedlings stage	Sowing date	24.03	23.03	–
	Seedling date	10.04	10.04	-
	Duration, days	18	19	-
	∑ of precipitation, mm	42.8	54.6	37.0
	∑t (act.), ◦C	141.8	157.5	156.5
	Mean t, ◦C	7.8	8.3	7.1
	HTC	3.02	3.47	2.36
Seedlings – stem elongation stage	Seedling date	10.04	10.04	-
	Stem elongation date	25.05	24.05	-
	Duration, days	46	45	-
	∑ of precipitation, mm	72.1	57.4	58.0
	∑t (act.), ◦C	533.0	617.6	397.6
	Mean t, ◦C	11.2	12.5	12.5
	HTC	1.35	0.86	1.46
Stem elongation – heading stage	Stem elongation date	25.05	24.05	-
	Heading date	04.06	07.06	-
	Duration, days	11	15	-
	∑ of precipitation, mm	13.0	19.9	48.0
	∑t (act.), ◦C	195.6	272.5	259.3
	Mean t, ◦C	18.0	18.2	16.4
	HTC	0.66	0.73	1.85
Heading– full ripening stage	Heading date	04.06	07.06	-
	Full ripening date	20.07	25.07	-
	Duration, days	47	49	-
	∑ of precipitation, mm	92.8	199.2	128.0
	∑t (act.), ◦C	957.6	1010.9	765.8
	Mean t, ◦C	20.4	20.6	19.6
	HTC	0.97	1.97	1.67
∑t (act.), ◦C during the active growing season		1828.0	2058.5	1579.2
Duration of active growing season, days		104	109	-
Growing season, days		119	128	-
HTC		1.21	1.34	1.72

tation was only 19.9 mm, which is 2.4 times lower than the long-term average (48.0 mm). During the heading – full ripeness period, the air temperature was +20.6 °C, which is 1.0 °C higher than the long-term average, and precipitation was 199.2 mm, which is 1.5 times higher than the long-term average (128.0 mm).

According to the data obtained, the hydrothermal coefficient was 1.34, which corresponded to the optimal level of moisture. In some periods, the following picture was observed: the periods from sowing to seedlings and from heading to full ripeness were characterised by excessive moisture (HTC = 3.47 and 1.97, respectively), the periods from seedlings to stem elongation and from stem elongation to heading were characterised by dry conditions with HTC of 0.86 and 0.73, respectively.

Varieties and lines of domestic and foreign breeding were selected for hybridisation. Parental components and cross combinations were grouped into three groups: I (MIP/MIP), II (MIP/F), III (F/MIP) (Table 2).

The ecological and geographical principle of selecting parental pairs for crossing is based on the fact that the greater distance between parental forms results in their greater genetic difference. Thus, a large number of cross combinations in populations and transgressive forms are ensured [18-20], as well as the combination of desirable traits and properties of different ecotypes in a new variety [21]. The variation ofgrain setting index according to the type of crosses (*Triticum aestivum* L. and *Triticum durum*

Table 2. Distribution of cross combinations by groups and types of crosses

Group	Origin	Type of cross	Cross combinations
I	MIP* / MIP	*Triticum aestivum* L. × *Triticum aestivum* L.	Erythrospermum 15–36 × MIP Vesnianka MIP Vesnianka × Erythrospermum 15–36
		Triticum aestivum L. × *Triticum durum* Desf.	MIP Vesnianka × MIP Kseniia Erythrospermum 15–36 × MIP Kseniia
		Triticum durum Desf. × *Triticum aestivum* L.	MIP Kseniia × MIP Vesnianka MIP Kseniia × Erythrospermum 15–36
II	MIP / F**	*Triticum aestivum* L. × *Triticum aestivum* L.	Erythrospermum 15–36 × Triso MIP Vesnianka × Triso
		Triticum durum Desf. × *Triticum aestivum* L.	MIP Kseniia × Triso
III	F / MIP	*Triticum aestivum* L. × *Triticum aestivum* L.	Triso × Erythrospermum 15–36 Triso × MIP Vesnianka
		Triticum aestivum L. × *Triticum durum* Desf.	Triso × MIP Kseniia

Note. *MIP* – domestic variety/line (the V. M. Remeslo Myronivka Institute of Wheat NAAS); F** – foreign variety.*

Desf.) was revealed. The results of the research showed that the efficiency of hybrid seed setting of spring wheat depended not only on the environmental conditions during pollination, but also on the genotypic diversity of the crossing components (Table 3).

Table 3. Characteristics of cross combinations by the average percentage of hybrid seed setting (%) in soft and durum spring wheat, 2022–2023

Group	Origin	Type/combination of crosses	Hybrid seed setting, %	
			2022	2023
I	MIP* / MIP	***Triticum aestivum* L. / *Triticum aestivum* L.**		
		Erythrospermum 15–36 / MIP Vesnianka	43.7	41.4
		MIP Vesnianka / Erythrospermum 15–36	36.0	56.2
		***Triticum aestivum* L. / *Triticum durum* Desf.**		
		MIP Vesnianka / MIP Kseniia	16.8	7.7
		Erythrospermum 15–36 / MIP Kseniia	1.0	4.1
		***Triticum durum* Desf. / *Triticum aestivum* L.**		
		MIP Kseniia / MIP Vesnianka	9.8	2.3
		MIP Kseniia / Erythrospermum 15–36	9.3	0
II	MIP / F**	***Triticum aestivum* L. / *Triticum aestivum* L.**		
		Erythrospermum 15–36 / Triso	17.2	14.6
		MIP Vesnianka / Triso	13.4	30.7
		***Triticum durum* Desf. / *Triticum aestivum* L.**		
		MIP Kseniia / Triso	0	1.9
III	F / MIP	***Triticum aestivum* L. / *Triticum aestivum* L.**		
		Triso / Erythrospermum 15–36	29.3	17.6
		Triso / MIP Vesnianka	1.0	6.8
		***Triticum aestivum* L. / *Triticum durum* Desf.**		
		Triso / MIP Kseniia	14.4	22.3
Seed setting average			16.0	17.1

Note. *MIP* – domestic variety/line (the V. M. Remeslo Myronivka Institute of Wheat NAAS); F** – foreign variety.*

The percentage of seed setting in hybrids was low and varied both by years and by types of crosses. Depending on the original forms, the average percentage of seed setting ranged from 0 to 56.2 % and depended on the growing conditions of the plants during the studied years. The average seed setting was 16.0 % in 2022 and 17.1 % in 2023. In 2022, this indicator varied from a minimum of 1.0 % in the hybrid combination Triso × MIP Vesnianka (*Triticum aestivum* L. × *Triticum aestivum* L., F/MIP) and Erythrospermum 15–36 × MIP Kseniia (*Triticum aestivum* L. × *Triticum durum* Desf., MIP/MIP) to a maximum of 43.7 % – Erythrospermum 15–36 × MIP Vesnianka (*Triticum aestivum* L. × *Triticum aestivum* L., MIP/MIP). In 2023, the percentage of seed setting varied from 1.9 % in the hybrid combination of MIP Kseniia × Triso (*Triticum durum* Desf. × *Triticum aestivum* L., MIP/F) to 56.2 % in the combination of MIP Vesnianka × Erythrospermum 15–36 (*Triticum aestivum* L. × *Triticum aestivum* L., MIP/MIP). It should also be noted that seed setting did not occur in the cross combinations MIP Kseniia × Triso (*Triticum durum* Desf. × *Triticum aestivum* L., MIP/F) (2022) and MIP Ksenia × Erythrospermum 15–36 (*Triticum durum* Desf. × *Triticum aestivum* L., MIP/MIP) (2023).

It should be noted that the lowest seed setting indices (0 % and 1.9 %) were observed in the II group of crossing, where the durum spring wheat variety MIP Kseniia of domestic selection was used as the maternal form, and the soft wheat variety Triso of foreign selection was used as the paternal form (*Triticum durum* Desf. × *Triticum aestivum* L., MIP/F), but in the case of backcrossing (*Triticum aestivum* L. × *Triticum durum* Desf., F/MIP) we obtained significantly higher seed setting indices – 14.4 % and 22.3 %.

It was found that the highest percentage of seed setting was observed in crossing such parental components as soft spring wheat variety MIP Vesnianka and Erythrospermum 15–36 line (*Triticum aestivum* L. × *Triticum aestivum* L., MIP/MIP).

Conclusions. The results of the studies showed that the percentage of seed setting in spring wheat hybrids was significantly higher (1.0–56.2 %) in crosses of varieties and lines of *Triticum aestivum* L. × *Triticum aestivum* L. compared to *Triticum aestivum* L. × *Triticum durum* Desf. (1.0–22.3 %), and *Triticum durum* Desf. × *Triticum aestivum* L. (0.0–9.8 %) despite the groups of crosses. It was noted that the highest seed setting indices were observed in the group of crosses where the varieties and line of domestic selection were used as paternal and maternal components. The lowest percentage of seed setting (from 0 to 1.9 %) was found in the cross combination *Triticum durum* Desf. × *Triticum aestivum* L., MIP Kseniia × Triso (MIP/F), which varied depending on the growing conditions. Thus, the efficiency of crossing and the percentage of seed setting depended on the genetic characteristics of the parental components and the conditions of the year of cultivation, which ensured genetic diversity in hybrid populations of spring wheat.

References

1. Orliuk, A. P. (2008). *Teoretychni osnovy selektsii roslyn* [Theoretical bases of plant breeding]. Kherson: Ailant Publ. [in Ukrainian]
2. Khomenko, S. O., Kochmarskyi, V. S., Fedorenko, I. V., Fedorenko, M. V. (2017). Drought tolerance and yield components of bread spring wheat collection samples in environments of Forest-Steppe of Ukraine. *Myronivskyi Visnik* [Myronivka Bulletin], *4*. 79–87. doi: 10.31073/mvis201704-06 [in Ukrainian]
3. Sozinov, A. A., Korchinskiy, A. A., Litun, P. P. (1991). Genetic aspect of grain production stability. In P. P. Litun (Ed.), *Urozhay i adaptivnyy potentsial ekologicheskoy sistemy polya* [Yield and adaptive potential of ecological system of field]. (pp. 2–13). Kiev: UAAN Publ. [in Russian]
4. Sozinov, A. A. (1993). Genetic markers in plants. *Citologiya i genetika* [Cytology and Genetics], *27 (5)*. 3–13. [in Russian]
5. Vavilov, N. I. (1935). *Nauchnyye osnovy selektsyi rasteniy* [Scientific bases of plant breeding]. Moskva-Leningrad: Selkhozgiz Publ. [in Russian]
6. Boguslavskiy, R. L., Golik, O. V. (2004). *Rod Aegilops* L. *kak geneticheskiy resurs selektsyi* [Genus *Aegilops* L. as genetic resource for breeding]. Kharkov: Plant Production Institute nd. a. V. Ya. Yuriev Publ. [in Russian]
7. Bohuslavskyi, R. L., Novoseltseva, N. P., Holik, O. V. (2001). Diversity of genus *Aegilops* L. is a source of valuable traits for wheat breeding. In V. V. Morhun (Ed.). *Henetyka i selektsiia v Ukraini na mezhi tysiacholit* [Genetics and breeding in Ukraine in the border of millenia]. (Vol. 2, pp. 438–453). Kyiv: Lohos Publ. [in Ukrainian]
8. Ermantraut, E. P., Hoptsii, T. I., Kalenska, S. M., Kryvoruchenko, R. V., Turchynova, N. P., Prysiazhniuk, O. I. (2014). *Metodyka selektsiinoho eksperymentu(u roslynnytstvi)* [Methods of breeding experiment (in plant science)]. Kharkiv: Kharkiv National Agrarian University named after V. V. Dokuchaev Publ. [in Ukrainian]
9. Padmanaban, S., Zhang, P., Hare, R. A., Sutherland, M. W., Martin, A. (2017). Pentaploid wheat hybrids: applications, characterisation, and challenges. *Frontiers in Plant Science*, *8*. Article 358. doi: 10.3389/fpls.2017.00358.
10. Lozinska, T. P. (2010). Inheritance of economically

valuable traits in soft spring wheat hybrids and their transgressive variability. *Agrobiologiia* [Agrobiology], *3*. 76–78. [in Ukrainian]
11. Lozinska, T. (2019). An inheritance and transgressive changeability of mass of grain of ear in F_1 and F_2 of spring wheats. *Lógos. Mystetstvo Naukovoi Dumky*. [ΛΌΓΟΣ. The Art of Scientific Mind], *4*. 129–131. [in Ukrainian]
12. Khomenko, S. O., Fedorenko, I. V., Fedorenko, M. V. (2016). Homeostasis and selective value of collection accessions of bread spring wheat for conditions of Forest-Steppe of Ukraine. *Myronivskyi Visnyk* [Myronivka Bulletin], *3*. 85–93. doi: 10.21498/2518-7910.0.2016.119180 [in Ukrainian]
13. Vlasenko, V. A., Kochmarskyi, V. S., Koliuchyi, V. T., Kolomiiets, L. A., Khomenko, S. O., Solona, V. Yo. (2012). *Selektsiina evoliutsiia myronivskykh pshenyts* [Breeding evolution of Myronivka wheats] (pp. 180–187). Myronivka: N. p. [in Ukrainian]
14. Kuzmenko, Ye. A., Fedorenko, M. V., Pirych, A. V., Blyzniuk, R. M. (2023). Ecological plasticity and stability of promising lines of spring wheat (*Triticum aestivum* L.) in terms of yield. *Plant Varieties Studying and Protection, 18 (4).* 242–250. doi: 10.21498/2518-1017.18.4.2022.273985 [in Ukrainian]
15. Demydov O. A., Hudzenko, V. M., Humeniuk, O. V., Pirych A. V., Kyrylenko, V. V., Siroshtan, A. A., Buniak, O. I. (2022). *Kataloh sortiv zernovykh kultur* [Catalogue of grain crop cultivars]. Myronivka: N. p. [in Ukrainian]
16. Triso (2024). In *Kataloh sortiv yarykh kultur* [Catalogue of spring crop cultivars]. Eridon, (p. 5). Retrieved from https://www.eridon.ua/i/cat/6227/katalog-yarih-kultur-2024-eridon.pdf [in Ukrainian]
17. Ermantraut, E. P., Karpuk, L. M., Vakhnii, S. P., Kozak, L. A., Pavlichenko, A. A., Filipova, L. M. (2018). *Metodyka naukovykh doslidzhen v ahronomii* [Methods of scientific research in agronomy]. Bila Tserkva: N. p. [in Ukrainian]
18. Vlasenko, V. A. (2010). *Selektsia pshenytsi. Spetsialna selektsiia polovykh kultur* [Wheat breeding. Special breeding of field crops]. In M. Ya. Molotskyi (Ed.), (pp. 5–33). Bila Tserkva: N. p. [in Ukrainian]
19. Vasylkivskyi, S. P., Kochmarskyi V. S. (2016). *Selektsiia i nasinnytstvo polovykh kultur* [Plant breeding and seed growing of field crops]. Myronivka: PJSC “Myronivka Printing House”. [in Ukrainian]
20. Lytvynenko, M. A., Volkodav, V. V. Scientific principles of the forming of the variety composition of cereal crops in Ukraine. *Plant Varieties Studying and Protection, 1*. 28–36. doi: 10.21498/2518-1017.1.2005.66833 [in Ukrainian]
21. Lozinskyi, M. V. (2018). Adaptivity of selective numbers of spring wheat obtained in crossing different ecotypes according to the quantity of spikelets in the main ear. *Agrobìologiia* [Agrobiology], *1*. 233–243. [in Ukrainian]

УДК 633.11“321”:631.527.5

***Іванцова Л. В., Федоренко М. В. Створення вихідного матеріалу пшениці ярої при схрещуванні видів Triticum aestivum* L. × *Triticum durum* Desf.** *Зернові культури. 2024. 8 (2). 206–211.*

Миронівський інститут пшениці імені В. М. Ремесла НААН, с. Центральне, Обухівський р-н, Київська обл., 08853, Україна

Актуальність. Сучасна селекція включає в себе багато факторів, серед яких проблема вихідного матеріалу виноситься на перше місце. Досвід світової та вітчизняної селекції показує, наскільки важливою є необхідність використання генетичних джерел з різних країн світу для створення нових сортів пшениці, які відповідають вимогам сучасного сільськогосподарського виробництва. **Мета.** Створити новий вихідний матеріал пшениці ярої при схрещуванні зразків видів *Triticum aestivum* L. × *Triticum durum* Desf. вітчизняної і зарубіжної селекції. **Матеріали і методи.** Дослідження проводили у Миронівському інституті пшениці імені В. М. Ремесла НААН України. Батьківськими формами для гібридизації слугували сорт пшениці м’якої ярої МІП Веснянка і лінія Еритроспермум 15–36, і сорт твердої ярої пшениці МІП Ксенія вітчизняної селекції та сорт пшениці м’якої ярої Triso зарубіжної селекції. У фазі колосіння проводили кастрацію квіток звичайним способом за 2–3 доби до цвітіння. Запилення здійснювали обмежено-примусовим способом у ранкові часи, переважно на 3–5 добу після кастрації. Створено 12 гібридних комбінацій. Обмолот гібридних колосів проводили вручну. **Результати.** Вставлено, що ефективність зав’язування гібридних зерен пшениці ярої залежала не тільки від умов зовнішнього середовища під час запилення, а й від генотипового різноманіття компонентів схрещування. Залежно від вихідних форм середній відсоток зав'язування зерен змінювався від 0 до 56,2 % і залежав від умов вегетації рослин. Середня зав’язуваність у 2022 р. становила 16,0 %, а у 2023 р. − 17,1 %. Даний показник у 2022 р. змінювався від мінімального 1,0 % до максимального − 43,7 %, а у 2023 р. варіював від 1,9 % до 56,2 %. **Висновки.** Встановлено, що відсоток зав’язування зерен у гібридів пшениці ярої виявився значно вищим при схрещуванні сортів та лінії *Triticum aestivum* L. × *Triticum aestivum* L. порівняно – *Triticum aestivum* L. × *Triticum durum* Desf. та *Triticum durum* Desf. × *Triticum aestivum* L. незалежно від груп схрещувань. Відмічено, що найвищі показники зав’язуваності зерен спостерігали у групи схрещувань, де за батьківський і материнський компонент використовували сорти та лінію вітчизняної селекції. Виявлено, що ефективність схрещування, тобто відсоток зав’язування у польових умовах, залежав від генетичних особливостей сорту та умов вегетації рослин пшениці ярої.

Ключові слова: *пшениця яра, гібридизація, схрещування, відсоток зав’язування, сорт, лінія*